

ABSTRACT

A model-based Fault Detection and Isolation (FDI) system and method based on
a hierarchical structure for monitoring overall vehicle system performance and
diagnosing faults is disclosed. The FDI scheme uses the available sensors in a vehicle
5 system and divides them into subsystems of smaller dimensions containing one or more
modules that are related or interconnected. The same module may appear in a different
subsystem, but the set of all subsystems does not have to contain all of the modules.
For this structure, an FDI scheme comprising several detector units is created. Each
detector unit receives information from the sensors and outputs a residual that is sent to
a residual evaluation unit which processes the data and performs the residual
evaluation for the selected subsystem. Finally, each subsystem outputs a decision that
is sent to a supervisor unit performing the final diagnosis.

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